

# RC Solar Lake Surface Cleaner

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**Abstract**— When people hear the term "pollution," the first thing that comes to mind is usually "air pollution." One of the most under-reported and under-discussed forms of pollution in the world is that generated by non-biodegradable garbage in our water bodies. In India, there is a significant amount of plastic debris on the surface of rivers and lakes. The Ganga River is one of the ten rivers responsible for 90% of the plastic that ends up in the sea (Source: Sky News), and there have been numerous reports of local 'naalas' and lakes becoming poisoned as a result of this rubbish.

This reduces the availability of clean water, resulting in significant depletion of water resources. 3245 hectares of lakes in Hyderabad disappeared between 2001 and 2012. In addition to cleaning the water bodies, preventive measures have been implemented using a virtual drone. We created a solar-powered drone to clean the lake's surface and reduce pollution.

**Keywords** - robotics, mobile application development, water cleaning

## I. INTRODUCTION

Lakes are an integral part of the Earth's geography. They are primarily valued ecosystems that give a wide range of commodities and services to humanity. Pollution Over the last few decades, there has been an accelerated increase in urban population without equivalent growth in civic centres, such as proper garbage disposal infrastructure. As a result, practically all urban water bodies in India are polluted and are utilised to dispose of untreated surrounding sewage and solid waste, with many of the water bodies eventually becoming landfills.

### 1. Applications

The bot's first use is for collecting trash from bodies of water. The second application needs to verify the water's ph level sensoT.

### 1. Features

When compared to other options, the total solution offered is reasonably priced. The bot that is being developed is sustainable and environmentally beneficial because it is fueled by renewable energy. Any body of water can employ the solution. Included are the use of image processing to gather trash that people have thrown into bodies of water and the avoidance of such situations.

## II. LITERATURE REVIEW

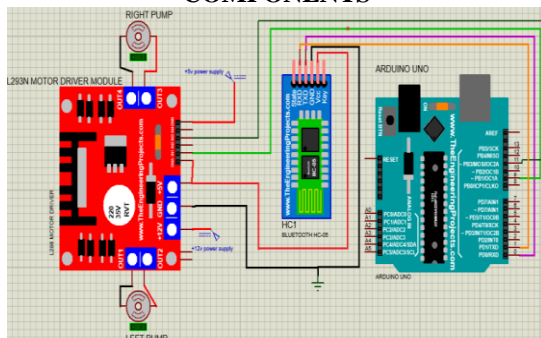
The Union Government launched the Namami Gange Programme [1], which comprises monitoring of industrial pollution and sewage treatment. The goal was to preserve the Ganga, the nation's river, and to effectively reduce pollution. However, it does not particularly address regulated or automated equipment for cleaning rivers. An autonomous ship called a Ro-Boat was presented by A. Sinha et al. [2] that is capable of identifying, gathering, and removing chemical sewage and trash that is present on the surface. Nevertheless, there isn't any protection for bot security in water.

[3] It is a raft-like device composed of rubber and PVC pipes that is used to clean water bodies, especially rivers. It contains a conveyor belt that gathers the trash; however, no power source is specified, and it does so on the raft itself; no information is provided regarding weight restrictions. The bot is inexpensive and constructed from recyclable materials, but once it is in operation, it cannot be controlled. At well-known ghats, trash skimmers [4] are pieces of equipment that assist in clearing floating rubbish from the river's surface. It's a major cleanup effort to get rid of tonnes of trash. It cannot be installed on every river or pond since it does not separate different kinds of rubbish, especially huge ones. Raghavi, R., and others.

[5] suggested a pH sensor and remote-controlled cleaning robot that assesses the biological activity and solubility of the chemicals

in water. The suggested project gathers the trash that floats on the river's surface in addition to keeping an eye on the water quality. Rahmawati, E., and others [6] outline the blueprint for a robot that will clear up trash that floats on the water's surface. They created a pontoon-shaped hull that satisfies every structural and hydrostatic requirement of the boat. The hull can support up to 16 kg of rubbish at most.

### III HARDWARE AND SOFTWARE COMPONENTS



The design of our proposed system is cost effective and working method is very simple [6]. At first when we switch on the power supply, the Arduino will check for Bluetooth device connectivity.

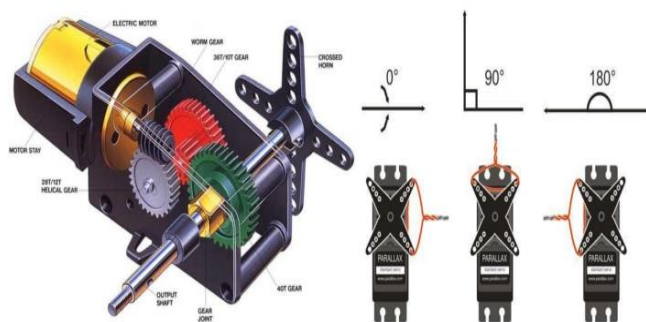


Fig 1: Servo Motor working principle diagram

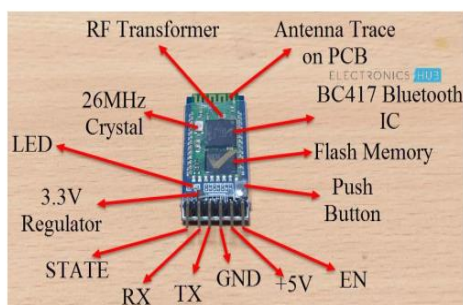


Fig 2: HC-05 Bluetooth Module

After successfully connecting the Bluetooth device with the android application RC car the device is ready to use. When we click on the forward button our device sends a signal to the Bluetooth module. Through the retrieval of our EDUZONE: International Peer Reviewed/Refereed Multidisciplinary Journal (EIPRMJ), Volume 11, Issue 1,

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Arduino can comprehend 115 code [3] what to do next. So, as per the code Arduino set one of the digital pin HIGH and this caused to start the motor driver module and open two channels. Through motor driver channels power will go into pumps. The Left and right movements is following the above principle, but the difference is for the right movement we open only the left pump and at that time left pump will be inactive. Same and opposite is for left movement. Finally pulling garbage is the servo motor's job. When we click the button in the app the mobile sends a signal to the Bluetooth module and it will go to Arduino. Then as per the code, the servo will rotate and equally the hand [5] attached to the servo will also pull up collecting the garbage. Fig 1: Servo Motor working principle diagram Fig 2: HC-05 Bluetooth Module At first, we connect the Bluetooth module with Arduino. We connect the Bluetooth module's [4] transmitter pin(Tx) with the Arduino's Receiver pin(Rx) 0. After that, we will connect the Bluetooth module's receiver pin(Rx) with Arduino's Transmitter pin(Tx) 1. These all are digital pins. We are connecting the receiver with the transmitter because when the Bluetooth module wants to send some data to Arduino, Arduino should be able to receive the data. So that if we don't connect with the receiver pin, the Arduino will not be able to receive any kind of digital signal. As this follows, the receiver pins are also connected to transmitter pins. Then comes the motor driver module. The motor driver module has 4 digital pins. These 4 digital pins are basically connected with the H bridge of L298 H bridge[8] IC. When we apply the 5v power supply to one of the digital pin, one channel will be HIGH and the current will be flow through that channel. There are 4 pins named In1 In2 In3 and In4. Apart from that 2 channels are there CH1 and CH2. When we apply 5v into In1, Channel 1 is high and the current will flow clockwise direction. When In2 is HIGH, current flow through Channel 2 in the anticlockwise direction. Same for In3 and In4 for Channel 2. So our pumps are attached to those channels. As per the code for a certain value, Arduino set one or more digital pins at a HIGH state. Those pins are connected with the motor driver module's digital pins.

So now when we click the Forward button the signal goes to Arduino through the Bluetooth module and then Arduino takes the decision and set pin no. 9 HIGH. Pin no. 9 is connected with channel 1. So as per the above discussion, Channel 1 should be high so that the pump will be also on. The same is also done with pin no.11. So for moving forward both pins are HIGH and for moving right digital pin 9 will be HIGH and for left digital pin 11 will be

